

FILE COPY

FOREST INSECT LABORATORY,
STANFORD UNIVERSITY CALIFORNIA.

372.4
632.4

UNITED STATES DEPARTMENT OF AGRICULTURE

BUREAU OF ENTOMOLOGY

FOREST INSECT INVESTIGATIONS

THE INSECT SITUATION

NEBRASKA NATIONAL FOREST

REGION 2

by

F.C. CRAIGHEAD
In Charge, For. Ins. Investigations

May, 1930

The Insect Situation, Nebraska National Forest

May, 1930.

May 14, 15 and 16, Messrs. Carter, Thompson, Nelson, Baumhofer and Craighead made field examinations and discussed the insect situation on the Halsey plantations. Field work included examination of the effect of Campoplex on the tip moth infestation, the increased prevalence of the pitch moth and injury caused by grasshoppers during the past summer. Future plans for continuing the work were considered and these, together with the situation as it appears at this time, are briefly summarized for future reference.

The tip moth infestation has markedly declined as a result of the successful introduction of Campoplex by Mr. Baumhofer. His records of last fall showed that, in the center of the plantation where the first liberation was made in 1925, approximately 82% parasitism occurred (80% Campoplex) and that it decreased gradually toward the edge of the plantations 4-5 miles distant to approximately 35%. In the central portions of the plantation the appearance of the trees is already markedly different from that observed by the writer two years ago. An enormous reduction in the number of infested tips has occurred, particularly the terminals, and already many trees are assuming more erect growth and spreading out from the characteristic bunched form which results from heavy infestation. (Baumhofer's figures are: 33% terminals infested in 1929 against 90% in 1925) The appearance of the trees at this time is most encouraging. In fact, it appears that this case of parasite control will be one of the most outstanding ever obtained within the continental United States. Two years ago, before the effects of the parasites were apparent, the writer recommended giving up the further planting of yellow pine, and other entomologists who had visited the area concurred in this view. This is cited merely to emphasize the former hopelessness of the situation. Several photographs, copies of which are attached, show the improved terminal growth as contrasted to the deformed appearance of the trees in areas where the parasites have not yet become effective. It is, of course, too early yet to predict whether Campoplex will bring about permanent control. Baumhofer's counts of parasitism indicate that already there is a slight reduction in the percentage of parasites in the area of the original liberation, although of course the amount of tip moth work is still markedly decreasing. Two or three years more should show conclusively whether or not we can rely entirely on the parasite for control.

The pitch moth infestation has been gradually increasing for several years. At the present time, probably over 85% of the Austrian, about 50% of the Scotch, and a much smaller per cent of the yellow pine are infested. The larvae bore beneath the bark practically girdle the tree, causing the tops to die during the winter and frequently break off during storms.

There seems to be some indication that Scotch and Austrian pines are serving as a source of infestation for the yellow pine. It also appears that the heaviest infestation in Scotch and Austrian pines occurs on the marginal trees of solid blocks of plantations and in the more open stands. In other words, there is probably a direct relation between the amount of infestation and density. Last winter, about 40 acres of the older Scotch pine plantations were thinned to an average density of about 700 trees per acre. These facts and conditions led to the consideration of the effect of thinnings in bringing about an increase in the number of trees infested. It is possible that considerable more injury will result; on the other hand, it is believed that such thinnings can be utilized to reduce the pitch moth population. In last winter's thinning operations an effort was made to mark all infested trees for removal, but during the winter it is extremely difficult to locate all the pitch masses.

Further entomological work was deemed necessary to check on the effect of these thinnings and to determine the possibility of utilizing them for control. We do not know in what stage nor where the young larvae of the pitch moth overwinter. They tend to re-attack on old scars and, as the eggs are laid in August, it is assumed that the young larvae will be hibernating in the vicinity of these older scars. It is also assumed that cutting the trees out during the winter will destroy the larvae, in that they will be unable to develop in the dried stems. These two points in the biology and control of the insect will be checked the coming summer and ~~many~~ other details of the life history gone into. Sample plots will be located in the thinned and unthinned Scotch pine plantations to determine whether an increase of infestation occurs following the opening of the stand.

There is also a need to determine the number of species concerned (Baumhofer has already reared three species) and to determine whether or not there is any preference shown by these species for particular hosts. In order to carry out the entomological features of this work, the Forest Service has agreed to set aside \$500 to cover the salary and expenses of an assistant during the months of July, August and September. A tentative plan for vigorously pushing control next fall was considered, provided, of course, it proves to be sound from an entomological standpoint. This plan, in brief, calls for an attempt to remove all Scotch and Austrian pines showing pitch moth infestation. (Several years may be required) The Scotch is large enough to be utilized and sold, which will partially offset the cost of control. In thinning this species next winter, special efforts will be made to remove all infested trees, ~~and~~ isolated trees ^{and those in more} in open blocks will probably be clear cut with the exception of the few trees that show no infestation. The same procedure will apply to the Austrian pine, but very little of this is large enough to be sold. Here again uninfested trees will be left, on the theory that there may be such a thing as immune individuals, from which seed could be obtained to propagate material for future planting. It was also agreed that for the next few years Scotch pine will be planted to a very limited extent.

Last year, there was a high mortality of yellow pine resulting from grasshopper feeding. This occurred in areas planted two to five years ago. The greatest mortality was in the hollows, probably reaching 75 to 90%, which will necessitate considerable replanting. In talking this situation over with Dr. Larrimer, in charge of Cereal and Forage Insect Investigations, he confirmed our views that the present, exceptionally wet, cool spring will probably greatly lessen or almost entirely check this damage the coming summer.* He feels, however, that the plantation should be watched very closely and whenever small hoppers are noticed in abundance, the matter should be called to the attention of Dr. J. R. Parker, of the U. S. Entomological Laboratory, Bozeman, Montana. Dr. Larrimer indicated that Dr. Parker would be very much interested in the situation and would probably make a trip into the area. It might be advisable for Mr. Nelson to write Dr. Parker at this time, completely describing what has occurred so that he will be prepared to visit the area on short notice.

In closing, the writer feels that it is worth calling attention to the desirability of joint conferences of this kind in attacking complicated field problems. Much more was accomplished in three days than could have been done in many months of independent work and, at the same time, each representative concerned obtained a composite picture of the problem from the entomological, silvical and administrative angles.

* i.e. provided the young hoppers have hatched.

F. C. Craighead



Nursery and plantation. Halsey, Nebraska.
May 16, 1930.



Two years good terminal growth on Yellow Pine following introduction of tip moth parasite, Campoplex.
Characteristic of stand in center of area of liberation.



Two years good terminal growth on Yellow pine following introduction of tip moth parasite, *Campoplex*. Characteristic of stand in center of area of liberation.



Typical tip moth injury on area where *Campoplex* has not yet become effective.



Typical tip moth injury on area where Campoplex has not yet become effective.



Typical pitch moth injury on Scotch Pine.



Typical pitch moth injury on Scotch Pine.